Notebook, N-07-01-08

This notebook covers the period January-November 1907. There is also a 2-page entry from January 1909. The book was used by Edison, laboratory chemist Olav Berg, and an unidentified experimenter to record notes regarding the preparation of iron-bismuth compounds for storage battery experiments. Several entries note the involvement of Otto Groethe. The 1909 entry pertains to the use of solvents in the manufacture of phonograph cylinders. The front cover is labeled "Important," "Edison Bismuth & [?] Expmts-- Iron Bismuth mixtures Olav Berg," and "Edison Special Tube Experiments." The pages are unnumbered, and the book has been used in both directions. Approximately 190 pages have been used.

The material not selected is a log of compounds prepared by Olav Berg according to Edison's instructions.

July 28 1907

Berg:

Dear Dr Brother Cook –

I want you to work one Iron Bismuth mixtures

4 oz of dry mixture is to be sent to Silver Lake for reduction by Hydrogen

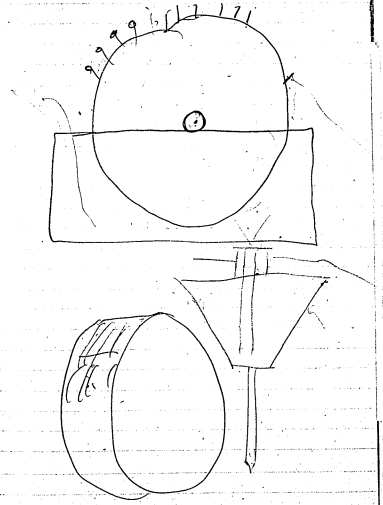
1/2 of the sample will be reduced self heated The other 1/2 will be run in Hydrogen so it will be non pyrophoric, Both will have 5% of HgO added –
The proportions should be 80 Iron 20 Bismuth
Two test packets will be made for Each 1/2 The results will be sent to you so you will know what the results are –

Read Carefully what I say about

Iron oxide in Dr Grathes Book—

Record clearly & plainly in this book just How each sample was made so that at any time it can be duplicated,

Any Bismuth salts you want order thro Mr Randolph.



Soaking Bi in green Exp to Oct 29 1907

No 1 708 green soaked in Sol 800 cc contain 120 grms Bi metal used 80 cc quite little liquid above green — poured off all cooled lamped dish — then put in paper to dry soaked 10 minutes no wash — Sol is very Conc $BiCl_3$ NH_4Cl NH_4 to make it as neutral as possible — its acid & deals on a little Ni —

No 1 Cakes together quite hard on drying —

Notice lots green pieces & not reduced Lice Turn — probably showed have used conc formed in little KOH — small bulk as at No 3 — Think No 1 want acid because dident put enough KOH into take Conc of Cl a formic —

Poor Lot —

Dried and lamp reduced

Black in many lots green patches unformed

No 2 Same as No 1 Soak 10 min -
but one quick wash —
dried —

Reduced formaldehyde + Excess of
21% full strength — plenty formac
This reduces clear blue apparently
& is better made than No 3 —

This is Great reduced lot of
1 2 + 3 —

Washed & dried in air and
temp all night

I find in the morning that it is
green — Evidently not washed Enough +
Bi oxide or something —
No 1 & 3 are black. 3 is the
best + is OK

No 3 soaked about 14 minutes
washed 3 times with plenty
water - stirred it with finger
dried

Reduced formaldehyde only little
KOH use little liquor & strong
formaldehyde as it does better than
use to much bulk of liquor
with same formald -
Even after 5 min heat not
reduced only little ways in
while nearly boiling. I found
liquor was only about acid
probably added more KOH,
Went kind of spoilt or not,
went acid again after putting in more
KOH - added lot KOH & think it will
not go acid again - Waste data
21% undiluted to take care of acids
& tested from time to time as it is
necessary to see if strongly alkaline

Dried overtemp all night
Black & good in the morning

No 4. 60 cc of the ROH Bi glycerol
Sol — soaked 10 min powder —
tamped no wash — Dried —

green reduced by formaldehy
& some ROH, seems to reduce
all through —

When washing cold water
OK but when washing hot
water & white stuff clouds
the water. This is probably
some organic material & wide
probably kill this Solution,
If just the white stuff is only $Ni(OH)_2$

I soak it in handle slush
full water and put on a clean
6 oth all night

No 5 glycerine BioHRON Sol
Soaked 10 min —
One quick wash — dried
No 5 seems as if it had little
finer mesh grain —

Reduced formaldehyde + KOH —
seems reduce all through —

Same white cloud on
white wash water
as noticed in No 4

Put in handle dish & soak
all night on steam plate.

washed it twice in morning
dried — dried gray — generally
it may be good & grey being
more metallic than dead
black there are some green
pieces —

506 -

Tartrate Bismuth dye strong in 10% KOH, then diluted to 5% KOH, soaked 10 min - 2 quick washes. -

Reduced by Formaldehyde in weak KOH - without drying the green - had renew KOH 3 or 4 times as it tended to go acid,

Dries gray black - pretty rug -

No 7 -

BiCl3 NH4Cl Conc very slowly
Sol. Nitrate K somewhat crystalized out
from Heat used in 445' —
Soaked 10 minutes — Whole
2 quick washes plenty water.
gaber large amount KOH xyl.
pour off & rinsed — dried —

Reduced - by Hypophosphite Na &
15% KOH - boiling only shows
signs of reducing after boiling
10 minutes with watch glass
over top of handle dish —
poor reducer I guess -
Cant reduce it —

I find that above can be reduced ok with
only little heat if 21% KOH + Crystals of
Hypophosphate are used + no water —
after heating it goes black quick
and then continues going + I am poor
reduction by heat only from ~~[illegible]~~
on hot plate — The whole of 107 left
I put in 21% KOH. with some hypophosphite
reducing hot after test shows metal black all
times - put in fresh sol KOH + plenty hypophosphite put
upon 3 hours warm - washed water then KOH.
then alcohol + dried all night oil lamp —

Reduced by hypophosphite

Diamond Rubber
33% ash —
4.09% Silica
0.55% Al_2O_3 —

8 708

Conc $BiCl_3$ NH_4Cl. soaked 15 min

then Tamped & all solution possible got off then Washed in water twice — then transferred to largest handle dish & soaked 3 or 4 times in large quantity water to remove Chloride ammonium —
set out to dry and temp all night —

Dries dark slate together has same color as original 708 —

I notice towards last
when KOH disappeared
& green was free of KOH,
that there was considerable
Bi OH yellow float &
seems weak KOH tends to
make the yellow probably
BiOCl is not decomposed well
by strong KOH but only by
weak KOH or long boiling
at 1st float colored —

green as it went in Tubes
No 9 — has 28.6% Bi as metal

7.05 — Soaked 55 minutes in mixt
Conc Sol of BiCl3 NH4Cl then poured
all off pounded, lumps several
times then a quick cold
pour & lump — then dried —
it clung a little together (1c)
lumps — put in about 10%
KOH, boiled 10 minutes about
then poured off & precipitated
3 times till no KOH by litmus
Each time put on hot plate
& allowed 1 day 2 hours or more
Now drying on hot plate,
evaporated — I used Cl. minimum
quantity of Bi solution —
just enough to cover green —
after drying put green into
fresh BiCl3 NH4Cl Conc & boiled
another 55 minutes poured off
lumped & poured then one quick
wash — dried — after drying & while
quite hot put into KOH solution
boiled 10 minutes — then poured
off & so on each time nearly boiling
water, until phenolphthalein showed no
KOH — dried —

Regeneration —

Cell 5365 =

Poured out the 21% NaOH, it was set aside in a filled with water, put in half plate solution nearby boiling — put in 3 o'clock Saturday PM — on all night — changed water at 9 am Sunday 10 or 15 drops 21% NaOH put in water — since 9 am been on bare now without plate — on bare plate until Tuesday 9 am Then put it — 21% NaOH — sent to Hoagy for running Regular — Marked 5365 A —

No 10

706 Soaked in strong ammonia & heated on hot plate —

fresh water from time to time between each water remains on hot plate till nearly boiling — when can just smell NH_3 look out for fumes — probably should have been washed free NH_4 it must combine with NO_2 as it comes out so slow —

Dried all night and Temp

No 11 Greens as used in tubes has 15.33% Bismuth as metal —

Soak 55 min in Conc HCl & HNO_3 mixture gradually — Then quick wash + filter several times, plenty water, boiled each time until only little Cl by $AgNO_3$ dried — dried all night ordinary temp.

Regeneration

5837 = Tuesday 10 am poured out Electrolyte - put in water & put on bare hot plate,
1130 took elements out & disconnected
nickel - immersed it in Can with 100 mlg KCy & put on heater
at 1 pm immersed the Ni in test tube with water & 100 mlg KCy for ½ hour before immersing Ni in Can

Before putting in Can put H_2O & 15 grms KCy in Can & set on bare hot plate to wash out anything in or on Can that might absorb any of the 100 mg KCy —

at 1215 PM put it in Can with the 100 mlg Sol & filled with water put glass cup over top - put on hot bare plate —

830 Wednesday poured out sol & put in H_2O with some KOH & heated
at 1115 AM poured out & put in 21% KOH set aside in C & CO
Thursday 8.30 AM cut up alums to Go assembled 5837 A —

5653

10 am Tuesday

Poured out electrolyte put in water & put on bare hot plate.
at 1220 Took M Electrode out & put in Sol Containing few drops KOH & 500 mlg Hypophosphite Soda in test tube —
also washed out hot the metal Cell with Sol Containing Considerable Hypophosphite Na & Little KOH.
Then rinsed Cell out & put in test tube Sol & Electrode in Cell set on hot plate with glass cover over at 1245 PM
Tuesday Wednesday May 830
poured out Sol put in fresh water & some KOH. Soaked till 11 15 am
then poured out & put in 21%
KOH & set aside Cold —
Thursday 830 am sent up to Jones it assembled & sent up Stevens
Marked 5653A

No 12

50 grms 708

100 cc H_2O Containing 20 grms

$NiCl_2$ – dried, no KOH, then put in tubes, then tubes boiled KOH 10% till free KCl then washed 21% KOH 4 times – The $NiCl_2$ is to stiffen green in Tamping or afterwards squeeze the green to keep Cinla ab

95 soaked green in Sol 40 min

boiled in KOH, then soaked out KCl & then put in 21% Sodium oxy till Monday – decided only three KOH are – 8190 91 92 – 21 KOH
8193-94-95 21 " 2 KOH.

No 13

Green 708 - Soaked Cone

Solution KCl - dried -

Tubes made + KCl soaked out, in alkaline water.
Then soak 21% KOH + run
Then go to stiffen green when
Tamping

75 Soaked green in sol 40

Put in 21% KOH after KCl soaked out, put in 21% K Solution Tu 62
Soaked till monday

Now are 8196 - 7 - 8 21%
8199 - 8200 8201 " 2 21% KOH.

14

Dup 13

Except Conc Sol Cond Saturd
tube. mud & ~~K~~ K_2CO_3 soaked
out in alkaline water

Soaked green in Sol 40 min

Soaked out K_2CO_3 & then
put in 21% KOH, Saturday to
Soak till Monday

Nos are 8202-3-4 | 21% KOH
8205-6-7 | " 2 KOH,

15

Dup X012

Except 100 cc water in which 20 grms $Ni.SO_4 7H_2O$ dissolved –
Soaked in sol 6 hours poured off – 1 quick wash then put out to dry

Dried partially on hot asbestos then out and lamp all night.

This is to be made in tubes & tubes boiled KOH & SO_4 previously out.

No 16

Green 708 Soaked Saturated
Chloride Barium — 1 quick
wash - dried - put in Incu -
5% Sol Carb K soaked 1.C.C
pores filled with BaCarb -
Wash well - dry —
Soaked green in Sol 40 min -
washed Chlk out by several hot
washes - put out to dry
all night —
to be made in tubes of
use

17

Dup 16 but use
Chloride Strontium —

Soaked green in 0.1 N 40 min.
by K_2CO_3 —
Washed KCl out. Several hot
washes — put out to dry
all night —

to be made in tubes & used

18

Not – Soaked in 21 o/o
KOH Containing 5 grams
Iodide K – put on hot
plate – on hot plate 6 hours
taken off put on table all night
in morning – solution poured off
& H_2O put in a tubes all day
in dark on some hot plates
finally cooked & dried all
night –

19—

708— Soaked in Conc
Mercuric Chloride —
Soaked same as 18 no KOH.

20

708 Soaked hat in Mercuric Chl in Ethyl alcohol Concentrated

Soaked Ethyl 5 hours carbolic washed dry put fresh Ethyl Soaked del night Then poured off & washed twice fresh Ethyl finally used H_2O all day Several times. bare hat plate Dried all night

21 —

708 Soaked in
21% KOH, Containing
3 grms Alumina in 100
cc KOH 21% —

Manipulated the same
as 18=1 No KOH,

Dried all night —

22 –

708 Soaked in Conc SO_4
NH_4Cl, NH_4 + Excess $Ni(OH)_2$
I evaporated some + found
plenty Ni in it —
after soaking dry +
then boil KOH, 50% —
Eliminate NH_4 + Cl —
washed once hot +
dried all night —

5913

This tube has seam pulled out top 1/2 inch - Tested on 3 hap near night - after soaking out in original cell - two changes water - found color tube silvery - grid brown but wipes off & silvery —

Put in 125 mlg KCY in Can & put on hot plate — ~~silvery~~

Monday - put it fresh water a few drops KCY,
On 1 hour put in 21% K
dent up slant

5819-A

Has tube dark red don't rub off - grid peacock

Was soaked same as 5913

put in 125 Mil/KCy in Can on hot plate

Monday put it in fresh water with few drops KOH.

Dark red tube 50 ill Cy peacock grid

soak for hour then in 21% KOH pass up stairs

5820 A

Tube x grid gold yellow

Soaked same as 5913

125 mlq KCy in can

on hot plate

Monday – Mag pick in funnel

water + few drops KOH,

soaked 1 hour then put

in 21% K sent up Slater

5864 Tube & grid bright

Soaked out same as

5913

Soaked in Cam on hot

plate 125 mlg KCy

Monday put in fresh
Wed. few drops KOH,
1 hour put in 21% N
Rest up 8 days

5653 B –

formerly soaked hypophosphate

Na – Mg – Nodes soaked first twice in Water – of Chem

Soaked all night in 125 Mlg KCy –

Dal slightly alkaline –

In mng found it not alkaline a sound Harrow clots on grid –

5365 = formerly washed out hot
from as A —

Now soaked out twice in
H_2O & then put in 125 mlg
KCy all night sol slightly
alkaline

found sol in neng not alkaline —

5365 B = soaked in test
tube with 250 mlg HCl —

5359
5360
5361
2491
2492
2493
} B

All soaked out then put in half H_2O + 125 mlg KCl soaked 18 hours hot as boiling + ~~[illegible]~~ then 2% KOH soak up blacks

all above solutions alkaline [illegible]

5359 C soaked in ~~test~~ tubes with 250 mlg/ HCl —

7527 — There is matter on surface on tube —
Soaked 125 mlg. RCy
all night
found Δ of not all Radium missing

E18- Nickels only

Grat over by Sadley

Monday —

Soaked out 3 times

last time water 70°C

Alkaline — at 1130 am

Tuesday put in 36 grams

KCy & set in Asbestos -

at 6 pm set it in Labb

close to hot plate to

soak all night in the KCy

Sol —

5872 [redacted] —

To be washed in 200 milligrams of fluoride ammonia made alkaline with NH4 — heated [illegible] in CCl4 — soaked out — [illegible]

7896 7897 — A —

Soaked out — put 125 mlg KCy
in — soaked all night —
friday morng put in an other
dose of KCy 125 Mlg Emch —

No 23 — 75 grm about
708 - Soaked in platina
dish Conc Sol of
fluoride ammonia
Soaked 4 hours washed
out — on paper all night
to dry —

5822 - A

Soaked out KOH, except slightly alkaline - Then at 10 am today put in H_2O containing about 1 gm Fluoride Ammonium made alkaline slightly by Ammonia - put in heat incubator -

Water got low 1/2 way down the tube & obliterated Number think I have the right one found remaining - placed in Zat off Epp feed grid -

~~5913 Opened up at top — small crack also~~

5864 A Soak out then H_2O added made shade alkaline & 250 cc KCy added —

5820 A soakout then H_2O added KOH made shade alkaline then 350 mlg KCy

5913 A - ditto added 450 mlg KCy
Split & opened at the top - 1 ring off
Close straight to top end

5819 A - ditto added 600 mlg KCy

2491-
2492 } C =
2493

Soaked out well in H_2O

then once in Ethyl —

Then at 11 am - put in Ethyl
Containing rather large quantity
$HgCl_2$ = } to reduced to
Hg + Calomel —

Out at 1.40 - grid + Tube
Clean - globules of Hg all over
Washed off far as possible
Water - put soak water
at 1 42 pm —

Seems as if nitrate
Decomposed —
after 13 min - H_2O rolling } come out
put in 21% ROH —

5361 C =

2 pm in ~~test~~ tube in H_2O Sol of strong $HgCl_2$ = Thro grid & tube cracked & red yellow closely adherent film which previous treatment did not remove — out at 3 pm — film off grid & off tube except in few small spots — semi amalgam'd — some Calomel shows on grid — Now soaking water — put in 340 put in 21% KOH

5360 - C =

Put in test tube with 200 mlg HCl. 5 hours — soaked further 20 min then in hot boiling 5% KOH.

5653 = C = Same as 5360 - C

Edison No 33

Edison 34

made

new tubes.

No 2 - not heated - soaked Conc $BiCl_3$ 24 hr. 10 minutes - dried - then ~~[illegible]~~ put in 21% ~~then~~ 15 min aft then in 5% NaOH & boiled in cell in hot plate for about ——— then Chloride pressed out

No 1+3 heated 1 min @ 120 Fahr. aft then soaked 10 min same sol & manipulated same as No 2

This forms one group — Lot metal Bi deposited 708 grams

No 16 - Not heated soaked 10 min & manipulated as above

17+18 Heated 5 min - 140 F aft immersed slowly & rinsed sol but by mistake stayed in 35 min — after washed manipulated same as above — Very much Bi metal deposited

This group is 719 Rec 2 hour drain in 60 go

Made N024 Edison

719 RQ 2 hour draining fellow

10 min soak in Conc $BiCl_3$ NH_4Cl — must
drained off as far as possible, no wash
out drying on paper = then ~~[illegible]~~
in 21% KOH, then ~~[illegible]~~ the ~~[illegible]~~ after
5 min put on Bunsen & Bunsen
burned & diluted to about 5%
or 6% & brought to boil for 10 min
then poured off & put in water
only — brought to boil —

PS = after drying on paper till dry
put on asbestos hot plate for 20
min before putting in 21% KOH,
it went — a little hot —

Changed H_2O several times not
much chloride present —
out on paper drying for —
the night

breaks up to 1/2 size — probably work
ok if screened thru 10 mesh —
then soaked it would probably
break to 20 mesh or finer —

705 dont break like this, mostly breaks at
cell — in using out KOH dont get yellow flood
like in 25 because did heat high enough long enough

Made 1540 No 25 Edison

719 Ra 2 hours drained —

10 mm — most Conc Bi Cl3 Ethyl Cl —
~~Dr~~ then washed twice with
Conc Sol of Ethyl Cl — Then dried
This will dry all night on paper

Notice this one has yellow float
from heating longer before washing
out the KOH

Guess that in washing out the
KOH from these Bi juices of
fine dust heat beyond light for
long time the Bi will not
go easily drops No 24 did not
show yellow float so I guess
its not easily Bi.

1540 Mc

105° Metallic Bismuth
Dr Gratta assay

Made

N° 26

Old Cad 2 18 45 amp Capacity
Nickels only percolated with KOH
in water for 3 days - last
water was alkaline to
prevent rusting - Put in
fresh water containing
15 CC of Conc HCl -
put on Saturday 10 30 am -
Sol acid - at 1 pm. gone
neutral - poured off sol
put in H_2O only let it stay
in 1 min as grids were brownish
from oxidation - Then put in
KOH, perhaps 3 @ 5% + put
on month at plate -

I should have dried the plates
& then put in H_2O with the
acid. This may not come up
first to no criterion of success
of a treatment

Edison 27 Made

719 RA 2 hour drain —
Soaked 10 mins 1/2 strength of
Reg Conc $BiCl_3$ NH_4Cl Sol used in
Edison 24 + 25 =
made by diluting with Conc NH_4Cl —
put in 80 cc of sol in 3/4 oz
glass cell measuring — leaving 1/4"
freeliquid above green in Evap
dish — Scarcely any gas comes
off — probably due to not having
residual NaOH Carbonated

flint yellow —

Soaked 10% ROH — washed out
KOH —

Edison 28 Water

Same as 27 except 708 green used — more gas comes off than 719 — in fact 719 gives scarcely any gas whereas 708 gives great amount probably due to carbonating of residual NaOH, — 719 being fresh & not carbonated & yellow

Did not show yellow float.

Boiled ROH - washed out

29 Made

719 Ra 2 hour —
Soak 19 minutes
1/2 strength Bi Sol —

Drained + clean 2 quick washes
with Conc NH_4OH
dried — then KOH, 10% all night.
Cold —

Float yellow

Boiled KOH, washed out

30 Made

Drop 29 Except 708 used

float Not yellow

Boiled Not, washed out,

708 soaked in pretty Conc Barium Chloride – ~~then~~ 20 minutes – then poured & tamped then dried –

After drying soaked in pretty Conc Sulphate Soda to precip $BaSO_4$ –.

Only small quantity left in form of $BaSO_4$ – must use very Conc solution try it again ~~later~~ I used acid on tray KCl seems to be plenty of $BaSO_4$ as much as Bi

After soaking 2 hours in Na_2SO_4 washed out rinsed 5 times H_2O in H_2O all night washed more in morning – then put in 5% KOH, warm, washed KOH out then dried

Urine

32 –

708 – Nearly Conc Bacl
To be soaked 1½ hours then dried
+ precip by Na_2SO_4 – Washed then
dried ~~& soaked by [illegible] Bacl~~
~~dried & reprecip by Na_2CO_3 –~~
~~Washed + dried~~
~~After the Copper Conc [illegible]~~
~~[illegible]~~ – no Tea
green soft + swollen as
precip expanded & burnt
green particles,

only one precipitn – so it swelled
normal – after washing
several times, the swelling
goes down – good deal
sticky float probably
lot of filt~~ed~~ float –
~~[illegible]~~
The Bacl + Nelsey Tod Conc
about 6/10th of the Conc would
be enough + a 2d soak
probably unnecessary
~~In~~ Can't remember but think it
not ~~[illegible]~~ Heated KOH –

~~[illegible]~~

5819 } Kott got nearly out
5864 }

then dried a cobalto hat immersed
in 50 cc H_2O Containing 500 mlg
Conc HCl — warm 20 minutes
soaked in water —
Mark, C —

5822 }
5820 } Kott nearly all out
put in 50 cc H_2O Containing 1.250
grms HCl — notice some black
came out in 5 minutes & settle
bottom test tube —
Soaked 20 min

Mark C —

5913 - split out top - bottle open
50 cc H_2O Containing 10 grms HCl —
grid hot dipped 1/2 min then put in
water —
Mark C

~~338~~ Edison 35-

719 RL Soaked Conc Soap Anthracene
in Benzol- Dried —

36-

719 RA - soaked Conc BaCl
dried, quick on asbestos - plate very
hot only 1 or 2 15@20 min —
then soaked Conc Na_2SO_4 — dried
asbestos quick — Then soaked
again BaCl Conc dried, then
soaked again Na_2SO_4 — let washed
it & then put in Tall Beaker
to soak all night —
Breaks up in boiling
get too much $BaSO_4$ in ppt
guess

Think it would be ok if
had percolated out the
1st soak of Na_2SO_4 —
but leaving so much
$NaCl$ in broke it up to
40 mesh —

37 =
7/19 - Saturated BaCl soaked
at 1125 am stood dry 12 noon
dried put in Cone KSO4 at
1246 dm - pound off 2 25 pm
put in H2O at 225 - 5 pm out
to dry all night.

2nd Soak 1015 am Dry
at 1105 soaked KSO4 at
1155 - at 1220 started
washing acid clear hot
long time many changes

1 lb Lithia Carbonate
will make .6477 lbs
Li OH –
to make 100 lbs Li OH solid
requires 154 lbs
Li_2CO_3 —

38

719 RA in saturated sol ortho phos
soda, very faint acid —
in soak in phos Na ortho – at
1130 am on drying 1205 in Conc BaCl
115 pm poured off 2 25 pm put
in water at 5 pm out dry all
night.

Resoak 2nd 10 15 am Drying
1105 – 11 am in BaCl 12 10 pm –
out at 1235 – washed many
times – boiled – Cond prevent
big precip with $AgNO_3$ –
put in some KOH boiled
~~Had quiz it up + dry it~~
~~to probably Mg – the~~
~~Ag is yellow – to probably~~
~~phos the Barium decomposing~~
~~by hot water –~~
will try it any way

39 719 RA in Conc Sol Tungstate
Soda faintly acid —

Soak at 115 pm Drying 2 20 pm
in Ba Cl. at 320 put in H_2O at
345 pm at 5 pm put out to
dry allnight

2nd Soak — 10 15 Sunday am —
Drying at 1105 am in Ba Cl at
1205 out 1235 — long washing
many changes H_2O before
got it free from $Ag\,NO_3$ precip —

7/9 in Conc Sol Nitrate Uranium
faint acid reaction –
in soak 11 35 and drying 12 25 pm –
in KOH 21/2 2 20 pm then diluted KOH
w/s water & boiled in a little
for few minutes – dried all night
and temp – ~~[illegible]~~ to
~~[illegible]~~ & – went little
finer – decant make 2nd soak
~~3 [illegible]~~ short of solution

719 in Conc Sol Nickel Chloride neutral — in soak 1137 am out drying 1230 pm - one quick wash in 21% at 2 20 pm boiled little after 21% diluted to about 5 @ 7 - then dried all night, found that it had broken up to somewhat finer coverage much so did not attempt 2nd soak. breaks up much finer —

in at 1137 am Drying at 1230 1 quick wash - then in 21% KOH. after diluting KOH boiled, then washed free of KOH, Dried all night —

2nd Soak 1020 am Dry 11,10 am 1 quick wash — in 10% KOH. at 1220 boiled - washed free Chloride —

719 2 Hour drying

42 =
719 Soaked pretty Conc Molybdate
Ammonia - very slightly acid —
in soak in Molybdate at
1120 on dryer 1205 pm off
1250 pm in BaCl —
Washed many times hot
water & Couldn't get it
entirely free of ag precip
but nearly - think it
decomposes —

No 2nd Soak —

43 =

719 Ra 2 hour dreaming soak
Conc Chromate K = noticed when
poured on Mobil it turned very
dark Chocolate Color — possibly
Combn Colors —

Couldnt get it free from Chromate after
BaCl put in — after boiling long time
I had put in more BaCl + then by
long boiling + changes of water
got it so good very little precip
with AgNO3 —

Soaked Chromate K 1125 am —
Dried at 11 am ~~[illegible]~~ in
BaCl 1255 —
Washed + boiled, couldnt
stop precip as cited above
till I gave it fresh dose
BaCl — then got it nearly
free — Chocolate Color

1 Soak Only

44 =
Conc Strontium Chloride 719 Ra
+ KSO4 —

in soak 950 am out 1015
Dried put in KSO4 at 2 30 pm
put in water at 8 pm —
in water all night then wash
from many water flushed while
then dried — only one soak —

45 -

719 Rd. Very Conc Sol Stannate
Soda - 830 am. permed off 1 quickwash
Very floated Beef - soaked long time, effervescing
This breaks up to quite fine probably
50 mesh & hard to wash
Sungh: soak - probably not
washed well 4 mg

46 -

719- Conc Potassium Antimonyate
105gm dry, 195 gm in Bal 9 qm = soaked long time
then washed thoroughly

particles cling — dont break up
in the slightest — washed
well & think —
Amph2 soak' —

2492
2493
unknown — } Soaked in weak HgCl — then in water —

Mark II

47 7/9 2 hour drain —
Soaked 12 hours in Conc
Strontium Chloride —
Then drained off & dried on hot
asbestos plate —

Put in Zinc Sulphate Conc
at 3 30 pm — Renewed $ZnSO_4$
at 5 pm — drained off &
put in hot water at 6.50 —
pm — at 8 45 pm there was still
Considerable Chloride by
$AgNO_3$ test — Evidently
Oxycl formed which had
gradually decomposed

Noticed $ZnSO_4$ water got little green
it was probably acid —

48-

719 2 hours drain —

Soaked 2 hours in Conc Solution Strontium Chloride — drained — dried on asbestos on hot plate —

Put in Sulphate Magnesia Conc. at 3 30 pm —

Renewed the $MgSO_4$ at 5 pm —

at 6 50 pm drained it & started washing it free of acid. There is at 8 45 pm a little Chloride but not near as much as in 47

at 9 pm very little agel left out to dry all night —

Very little white comes off in washing which is different when KSO_4 used —

49 -

708 green

Soaked 2 hours in Conc Strontium Chloride -

Drained off & dried on asbestos on hot plate - at

150 pm put in Conc K_2SO_4

Removed K_2SO_4 at 3 35 pm

" " 6 10 pm

at 730 pm started washing with half water, at 9 o'clock scarcely trace ag. C.P. -

50 hours remaining Cl. - This shows great dif in porosity out on paper. To dry -

Made -

50 —

Ra XXX

Soaked Conc Strontium Chloride 2 hours — drained + dried on Asbestos on hot plate —
Put in K_2SO_4 Conc at 150 pm
Renewed " " at 335 pm
" " at 610 pm
+ Started washing with hot water at 730 pm —

RA XXX Soaked all night in Strontia Chloride. 9 pm till 9 am Sunday Drained - dried on hot plate aodaatoo, at 1030 AM Sunday put into Conc Chromate Potash to soak till Monday morning

$SrCrO_3$ unlike $BaCrO_3$ is sol in 500 pts water & may not work like $BaCr$ - of the good test tubes —

Cant Wash out Chrome - Well try it any way

52.

7/9 2 hours draining –
Soaked all night & until 9 am Sunday
in Conc Strontium Chloride – drained
Dried – put in at 10 am into Conc
Chromate of Potash – to 10 – 12 until
Monday Morning –

Strontium Chromate unlike $BaCrO_4$
is sol in 500 pts water + it
may not work

Can't wash Chrome out

MG

Abandoned

53.

7/9 2 hour drawing
Soaked all night in Conc Nitrate Strontia
on drying 9 am Sunday - put in
Sulphate of Zinc at 10 am to.
Soak until Monday

Washed B at water

54 =

7/9 2 hour — soaked all night in Cond Strontium Nitrate, out drying 9 am Sunday — in Conc Sulphate of Magnesium at 10 am to soak until 1 Monday morning

Washed Hot water

55

Soaked 2 hours $SnCl_2$ dried —
put in Phos Acid at 3 30 pm to soak
till Monday morning —

Washed & Saturated

56

'19 2 hours -
soaked in moderately strong Magnesium Chloride (Neutral) - soak all night - Monday dry + then boil 10% KOH. to deposit hydroxide Mg in pores of green —

57 =

Took some of 49 that was soaked in $SrCl_2$ + then K_2SO_4 & dried & — Soaked it in 1/2 strength of Bismuth Chl NH_4Cl — 4 hours — then drained & dried — put in 21% for 2 months then diluted to 10% KOH + boiled washed well scarcely any Cl yellow float lots of it -

58

7/19 – 2 hours

Soaked allnight from 5.10 pm till
9 am – monday in 1/2 strength
$BiCl_3$ NH_4Cl – ~~to~~ (ie) distilled till
most Conc Sol 1/2 = Monday
decant – dry & boil about hour
not less – actual boil – in 21% KOH.
2 min then dilute to 10%

Lot of ~~[illegible]~~ crystallized out $BiCl_3$ NH_4Cl
its mixed in funny hunt,
washed it well with Conc
NH_4Cl before KOH,

Not all the Cl out yet but
only a few –

59 =

719 soaked 2 hours
$SrCl_2$ dried —

Now soaking in Conc Aluminate
Potash — Monday wash out.
Boil —

Leached many times H of K_2O
Don't think it Clean scum on Top —

Will try it anyway —

It breaks up to 1/2 size
Thus strange — S

60 -

719, soak 2 hours Conc
$SrCl_2$ - dried, soaked all night
in ~~Hot~~ Conc Sol KSO4 -

Washed -

61

719 2 hours Soaked all night
18 hours in Conc Barium Chloride
drained - dried - put in Chromate
Potash 9 am monday —
out Tuesday morng 9 30 am | now
washing — all day in pot on iron
hot table — finally got rid yellow
coolar — green is dark brown out
drying 3 pm Tuesday

62 –

719 2 hours $SrCl_2$
dried Then, K_2SO_4 – dried –
This is 49 dot –
Now put in $SrCl_2$ again at 1015 am
out drying 9 am Tuesday
To soak in Sulphate of Magnesium
12 hours —

63

719 Ra 2 hour

Conc sol Magnesium Sulphate
in soak 2 pm Monday to Tuesday all
night — Dried —
Now soaking in Conc Strontium Chloride
all day & night till Wednesday
morning

64

719 Ra 2 hour
Soaked all night Conc Magnesium
Chloride — In morning
put in Phosphate Soln but dont
dry as Mgcl goes and just drain it
+ put in the phos Na
put in phos at 9 am —

65

719 Ra 2 hours

Soaked allnight in Magnesium Chloride
Drain it only dent dry &
~~then quick wash~~ with water
twice & put in Carbonate Soda
~~for 12 or more hours~~ —

66 Soak 12 hours or more in
Na Carbonate, dry —
then soak 12 hours Chl Magnesia
719 2 hours

67 Soak 12 hours. Carb soda.
Conc – dry – then soak 12 hours.
Chloride Calcium –
7/9 2 hour

68 Soak 7/9 2 hour

Phos Soda ——— 12 hours

dry — Soak 12 hours Conc Bath 2

69 719 Soak 12 hours Conc BaCl2 dry
then soak Magnesium Sulphate 12 hours

70 719 Soak in 2% KOH
12 hours, ~~[illegible]~~ dry — then soak
in ~~[illegible]~~ 1/2 Strength $BiCl_3$ HCl + Cl —
12 hours, closed bottle prevent
Evap —

Washed hot water.

71 Soak 719 12 hours phos Normal Sect
Sodi or K ~~[illegible]~~ quick wash - dry
then Soak 12 hours $CaCl_2$
Washed —

72

.719 Soak 12 hours $CaCl_2$
Conc — gold wash — dry — Soak
K or Na fluoride according to act Sol.
12 hours

73 = 719 2 hour soaked all
night in Sol made by using Nickel
Chl freed from iron by Hypo - The
Ammonia added until some Ni
hydroxide precipitated out, filtered -
Dried
Boiled long time KOH 10% but in 21%
for 3 hours on hot plate -
Washed free KOH.

74 Dup of 73 but
Wednesday morning Dry at
Resoak square at 12 hours
Put in Kott. bail - awarded.

75 =

Lot of 49 - finished

Now soaking all night in $Ni(OH)_4$ in Chloride NH_4 + NH_4 —
in morning dry then soak 21% KOH 2 minutes + pour off that add fresh 21% + keep on hot plate 3 or 4 hours then dilute to 10% + boil - or keep on hot plate with glass over to nearly boil for 1½ hours or so (see notes)

76 719 2 hours –

Soaked 1/2 strength. $BiCl_3$ NH_4Cl. 10 minutes drained + put in large quantity water, wash pass oxy chl off + dry and temp – then put in tubes + soaked 24 hours cold in 21% KOH –

77 = 719 2 hours —

Soak Conc solution Bismuth Trichloride in Acetone —
Soaked 1 hour 25 min — washed once with absolute acetone —
Dried — put up acid treated flake

78 Same as 77

Except $BiCl_3$ acetone solution
diluted by acetone to 1/2 strength,
put up with acid treated flake
soaked 2 hours 45 min —
drained & 1 quick wash with
absolute acetone —

79 -

Moore CP ~~Comp~~ unknown Conc B, Pg in
absolute acetone - pour from Iron
~~[illegible]~~ Put up with acid washed
flake. In soak 2 hours
45 minutes, drained one
quick wash absolute acetone,

80 —

7/9 2 hours

Soaked in 1/4 strength of $BiCl_3$ in absolute Acetone — not free from Iron — ~~[illegible]~~ out of $BiCl_3$ acid at 510 pm — washed once with acetone — Heated KOH, washed — finished —

81 = This was 1077 (numbered) —
after making some tubes
I took balance & used small
Evap dish 3/4 full water
added to it 50 cc of saturated
solution of $HgCl_2$ in water
& soaked organs in it one hour
then KOH, hot & washed

82 =

2 5 gram Irons soaked
— minutes in Conc CP
$BiCl_3$ in Acetone, (dark) ~~45 minutes~~
soaked —
to 62 put up 2 tubes Each

One with 2.10 ff 2 grams
one with 21 K ferrin —
~~Bad~~ washed with acetone —
dried several hours hot on
filter paper — put — KOH
21% —

83 a

3 Reg tubes loaded 7/19 2 hours
KO_3 1/2 of acid strength —

Tubes soaked 1 hour 20 min in
Conc Sol free from of $BiCl_3$ in acetone
washed quickly in acetone
dried on carbon & boiled KOH.

21% KOH. 4 tubes. —

The $BiCl_3$ acetone sol is evidently
~~decomposing since it stands~~
somewhat bedimmed & some
dark precip floating —

5 more soaked in same strength
Sol — should have been 1/2 strength
Made on Nutlake — soaked
1 hour 20 min —

84- 719 2 hour

Soaked in Tetrachloride Tin in acetone — at gradually colors acetone red — soaked 20 minutes — dried — then KOH, — wash out ~~[illegible]~~ not free Cl — out dry

oil

85 —

7/9 2 h

In Conc $HgCl_2$ in H_2O, soaked

35 minutes dried — then in

NH_4 to make ~~white~~ white precip

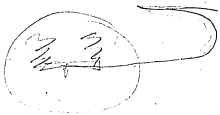
~~Coarse~~ in pores of green

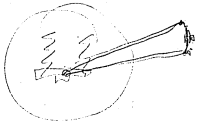
been in KOH,

now washing —

Friday morning finish the washing

CR —





86 =

719 · 2 h —

Nearly Conc. Stannous Chloride
in Acetone — Soaked 3 hours 25 mm
dried Hot — Koff
non-washing washing
washing washing washing

87=

719 2 h

Conc Bromide Cadmium in H_2O
Soaked 3 hours 25 min — dried
Now Washing fresh KOH
Washing friday may

Iron mix used with Lead Cells

88 –

Req 5 gram Iron pocket

Soaked in 3/4 Concentrated $BaCl_2$
15 min soak dried then in KSO_4 –
washed H_2O –

89 – Req 5 gram Fe – Conc $BiCl_3$ NH_4Cl
15 min soak washed Conc NH_4Cl –
dried then KOH & wash

90 Req 5 gram Fe 1/2 strength Sol $BiCl_3$ NH_4Cl –
15 min soak washed NH_4Cl Conc – dried –
KOH + wash

91 Reg 5 gm Fe

in $SrCl_2$ - 20 mm soak
K_2SO_4

92 Reg 5 gm Fe
in $MgCl_2$ - 15 mm soak

93 - Reg Fe in Ferric Sulphate
its acid - 12 min - too acid
Zotty grid —

94 - Req 5 gm Fe
Ferrous Sulphate.

95 Req 5 gm Fe
Chromate K — soaked 12 min -
then $BaCl_2$ -

96 = Req Fe 5 gm
Cadmium Sulphate
then KOH -

97-

Reg 5 gms $PtCl_2$

dipped _____ in Conc $PtCl_2$
in CP acetone which has been
distilled from $PtCl_2$ & slight discolor
in 40 mm - not washed with
acetone - dried a little -
then - KOH -

98

7/19 2 hours

Soaked Conc $BiCl_3$ in Acetone
purified by distilling it with
$BiCl_3$ — it no longer decomposes —
Dry it naturally — don't use
heat as it decomposes
then KOH,
Now in KOH, all night.
Wash free KOH Saturday

99 = 5 gram Reg ½

Soaked 30 minutes in CP acetone
saturated with $BiCl_3$ – acetone
distilled with $BiCl_3$ —
Then ½ washed with $BiCl_3$ purified
acetone & dried natural temp
all night —

Dried on top of an open
evaporation all night —

XCP means
acetone purified by
distilling with
$BiCl_3$ anhydrous

See what was in tubes —

100

3 tubes Dup
No 3 flake — not eluted at 4
719 green —

Soaked 15 minutes in XCP
acetone (by distilling with $BiCl_3$) 4 —
$BiCl_3$ conc — Washed with
XCP acetone —
Dried all night on flask
over As_2O_5 —

101 –

Conc Aluminate K
Hot plate several hours
wash out —

~~Cyanide~~ 16.6 cc how
1 gram Bi

120 / 800 (6.6
720
800

800 cc —
110 @ 120 gm Bi metal —

100 cc

4 / 120
15

100 —

15 gms 100 cc —

102

Note below

719 2 hours Peroxidase Cy
Hypochlorite K — washed free
K — dried — soaked 1½ hours
Conc BiCl3 acetone XCP —
dried air — then KOH hot,
washed free —
~~Hot~~ Soaked all night standing
night in Hypo —

~~If a cool hot oxidize the acetone use BiCl3 KOH KCP~~

Product dark green

163 =

7/19 2 h

Soaked in KOH, with about 2 oz Tungstate Soda, soaked all night Sunday 7/18 — in morning heat, then washed out

104 – Edison 96
72 Reg 5 grains –

Soaked in Ferrous Sulphate.
then without drying put in 21%
K – washed well

105 =

7/9 2 hours

at 8 Reg Test 72 5 grms

Soaked together in 21% 2 grms LiOH

Hot — To be washed well

+ Run together

2 tubes 21 KOH — 6 76 —

~~2 " " 21 " 2 LiOH —~~

~~2 " " 21 " 12 " 2 LiOH~~

~~Precipitation~~ No tubes —

2 tubes 21 — 2 LiOH.

106 -

7/9 2 hours

In Conc Sol (slightly diluted) of Thorium Chloride - to a little acid —

Soaked - 2 hours - 1 quick wash

Dried all night natural Temp

KOH Hot & crushed Tuesday

107 This is part of 102
plain without $BiCl_3$ acetone

108 7/9 2 hours

Green put in Nitrate Bi quite acid, & then mechanically pounded fraccs + put in 33% KOH – but acid attacked green violently. Split up to fumes much all

Cold no heat used

Thoroughout process

109- 719 2 hour

Soaked 1/2 hour in Nitrate

Burnished Cone in Acetone

Put in 10% KOH after drying

No heat used throughout

process.

Product split up Kept

Req Regs

110 719 - 2 hrs

Put in Conc Nitrate Bismuth in Acetone - 1/2 hours drained then without drying put in 21% KOH - it split up to finer needles

111 719 2 hours
Heated in Conc Ammonia
Washed free of ammonia
only shade blue at 1st
finally white on hot
plate ~

112 708 Big Drum —
Heated with Conc Ammonia

Washed free of Ammonia

for 1st 2 or 3 hours on hot
plate Sol was blue but
finally became clear
Dno blue

Soaked all the tubes in 21% hot for several hours, then diluted to 10% & boiled for 1/2 hour then poured off & heated with H_2O & little KOH, twice hot plate. Then left all night in H_2O & little KOH, on asbestos in morning only a trace of Chlorides washed & sent up to Walter Archer in H_2O containing little KOH to keep from tarnishing —

The tubes are quite clean soaking in the Acetone sol caused some deposition of B_i where now Egg-oxed but very little — This process will do OK

It may be the amount of B_i is not enough but it is certainly as much if not more than 1/2 strength of the strongest solution in acetone we ever possibly could have made

see Next page

Acetone distilled from Zn Chloride has 9% of $BiCl_3$ — 6.25 metallic

The large lot of dipped tubes made Feby 17th 1908 is made from this sol

its been made over a week & is nearly ~~[illegible]~~ clear as water — showing no decomposition to speak of —

Soaked 1 hours short exam lying off & immersed & shine in distilled acetone for material & then dried on glass 1 ft above asbestos on hot plate all night —

Took another Tube in grid weighing
17.040 + soaked it in nothing
Solution used with the tubes
in preceding page soaked
8 minutes + then weighed it
after shaking off in few seconds
the outside liquid having
Evaporated off
it weighed 18 grams
therefore absorbed 1 gram
of CKO Solution
This cant give more than
100 milg of Bismuth —
probably medal loss 1½%
16 grams of A.4 —

Don't think it will do much
if it does very little Bismuth
will be reason
only be 7 or 8 cents per cell —

Dried tube
+ it went down to 163 milg absorbed
+ could still smell acetone
probably 60 milg metallic Bi
is what really goes in

if this works than the Bi
must be Catalytic —

Made new tubes 719 2 h
Reg

		wt
No	1	wt 16501
	2	14994
	3	16.469 —

Soaked No 3 ½ hour in ZnCl purified
acetone saturated $BiCl_3$
9% $BiCl_3$
weighed 17157 gain of
688 milgrammes —

after resoaking 4 hours + 45
minutes — weighs 17 255
a gain of 786 total,
or 98 milg from the longer
Soaking

Think 1 hour total soak
is quite sufficient —

another tube No 1

Soaked Continuously 5 hours
gained 759 mlg almost
Exactly what No 3 did —

about 75 mlg of $BiCl_3$ in each
tube — or
45 mlg Metallic Bismuth

or 14 grms $BiCl_3$ per A.H.

or 9 grams Metal —

50 Cells per lb metal
which at 200. 4 Cents Cell —

Experiments with disalcoy
Shellac in Melted Solvents

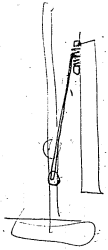
January 4 1909

Naphthalene works good makes
fairly thin liquid when in
contact with flow into a
revolving mandrel to mould by
spinning — for making paper tubes
of coating outside 1/16 of naphth
can be increased to get very
fluid — the surface when
poured on mandrel by hydrocarbon
solvent low temp of
mandrel ok.
After some time it probably
hydrolyzes out within the
body & its color changes
& it very tough & in thin
layers flexible — just
the thing —

This idea of disalcoy shellac
in a molten solvent & then
afterwards separates in the thin
film records which you through
for weaving — rough handling

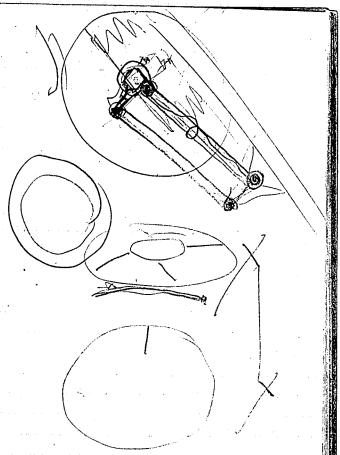
Camphor rout as good as Naphthalin, it stays soft & does not segregate —

~~The other~~ Phenylamine is curious makes the liquid solidifies soft but in time the phenylamine segregates & gumbles when in thin layers & the cullon becomes hard & tough —

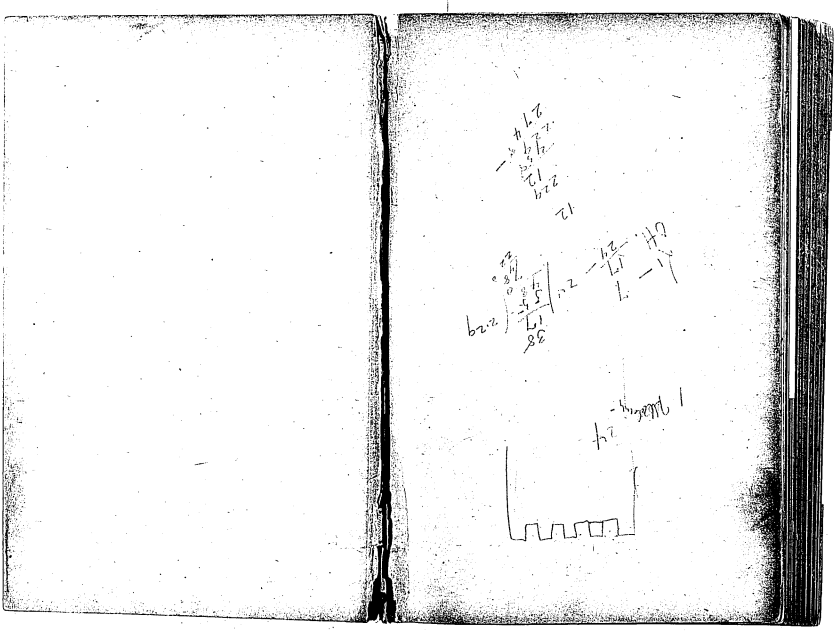


$SrSO_4$ - Kauf - Sol 10 000 pts H_2O
Ca fluor 1 Litre dis 14 mlg — K ÷ 26 000 H_2O
$BaCO_3$ Kauf - 64 000 H_2O
$CaCO_3$ " 99 000 "
$SrCO_3$ " 121 000 "

Barium Chromate 1 Litre 4 mlg Kauf — 86000 H_2O
Strontium " 800 pts distilled
Magnesium hydroxide Kauf 1 Litre 8 mlg from 55000.
Tech KOH —
Millons Base ?
Strontium Molybdate 9600 H_2O
Barium " 17000 "
Calcium "
Cadmium pyrophosphate mol KOH —
Lithium Orthophos 2500 pts H_2O
Magnesium Metal Orthophosphate mol H_2O
Strontium Orthophos "
Uranyl ortho Phos "
Manitate Mg Li Sr Zn "
Put Sulphur in pores by CS_2 5 dissolved therein
$BaSO_4$ Kauf 1 Litre 2 mlg equals 429 000 —
$PbSO_4$ 36000 pts H_2O
Meta Borate Magnesium } mol H_2O
Fluoride " }
Phos Ba (di) 2 mol H_2O
" Sr
Calcium Hydrox mol KOH — 50 000 parts



[THIS BOOK WAS USED IN BOTH DIRECTIONS.
THE FOLLOWING PAGES WERE FILMED FROM
THE BACK END FORWARD.]



I want you to work exclusively on Iron Tungsten mixtures so as to find out the best way of making the same so as to get the greatest output, economy & convenience

So far no precipitated oxides worked well even when reduced by Hy this refers to non alloys

You should try every kind of Iron & Tungsten salt, and combine them in various ways.

By precipitating together by igniting the oxalates together with the tungsten salts

By moistening ignited Fe_2O_3 with the salt of tungsten.

By fusing sulphate of iron with sodium sulphate until SO_3 practically disappears.

By heating the soluble matter
this oxide is the purest product
we so far have obtained & is
better than the ~~oxide~~ oxide
from oxalates.
The Fe Na sulphate oxyde can
be moistened with the
tungsten salt.

There may be some virtue in
the oxyde from fusing
ferrous potassium sulphate.

Also fusing other iron salts with
nitrates. Chlorides set to get
an iron oxyde in different systems
states

Also double salts of iron +
tungsten, iron Na + W.

Iron K + W fused + exhausted

Commercially we can no longer use Oxalates as Oxalic acid is too high & we shall use the Oxide from fusion of ferrous Sulphate, which is cheap process so as your Report states bear in mind that the value of the final result will depend upon how cheap it can be made

Or can pocket so far have an economy running from 40% efficiency up to 71%

and 440 milliamperes hours per gram of mixture including the 5% of HgO.

	Capacity	Ampere Efficiency	Watt Efficiency
Tu 80 Ri 20	1717	85.1	61.6

D.C.	Capacity	Ampere Efficiency	Watt Efficiency	
80 Tu 20 W	1710	87.6	64.7	5% H2O non hygroscopic
80 Tu 20 W	1481	68.4	49.6	5% H2O Self heated
Webb		— 0	—	
80 Tu 20 Su	2280	90.3	66.8	5% H2O non hygroscopic
-- -- --	1900	82.2	60.1	— — —
-- -- --	2005	66.3	—	5% H2O Self heated
Gleitz		— 0	—	
80 Tu 20 Sb	1781	76.9	54.4	5% H2O non hygroscopic
		— 0	—	
Regular	1415	76.6	55.8	Regular mixture
Berg				
80 Tu 20 Ri	1717	85.1	61.6	5% H2O non hygroscopic
Low OH				
From Tu 80 Su	1762	81.3	59.2	Self heated H2O Reg.

[ITEM FOUND IN BOOK]

50

50

B1

~~1275~~ - Wo-washed 1 gk Soak 5 min
1267 ~~1284~~

2 min soak washed 3 times 1275 - ~~1284~~
1 quick wash 1275
1/2 strength 1 1200
1/4 " 1210
1/8 - 1230

Soak 5 min no wash - L1 1200
10 " 1440
20 - 1340
Double soak 1250

Acc. R glycerol - Immediately L1 1230
" " 1250
" " Hypophosphite 1330

Pr Cl Hypo soak 10 min 2 gk (wo-washed)
wet gk Hypoglycerol Na 1380

25 Rem

Edison 22 Tone Nitrate Hypo 1350
24 - 25 min no wash 1450
23 wash Hypo 1500
29 1/2 strength wash Hypo 1380
27 - 1425
30 - 1375
33 - 1320

[ITEM FOUND IN BOOK]

25

Very E 40 — Combination

43 — no light. 1215 —

44 — no light. 1220 Sr Soy

45 — Northumb. — Beef — 1215 — no li